

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Dong-seok PARK, et al.

Continuation Application of
Appln. No.: 08/884,630

Group Art Unit: Not Assigned

Confirmation No.: Not Assigned

Examiner: Not Assigned

Filed: June 25, 2001

For: MULTIMEDIA MULTIPLEXING METHOD

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Amend the specification as follows:

Page 1, first full paragraph, please delete in its entirety and insert the following new paragraph:

The present invention relates to a multiplexing method for multimedia communication, and more particularly, to a multiplexing method which is compatible with H.223 protocol by changing a header of a multiplex-protocol data unit (MUX-PDU).

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Page 1, second paragraph and continuing to page 2, delete in its entirety and replace with the following new paragraph.

In general, H.324 recommendation prescribes a multiplexing of video and audio signals which is effective in an error-prone channel such as a wireless channel, and includes H.223 multiplexing, H.245 controlling, H.263 video CODEC and G.723.1 audio CODEC. Also H.223 multiplexing is recommended as a method for multiplexing video, audio and other data in protocol data units (PDU) in order to realize a video telephone and video conferencing in a total digital telecommunication network by the ITU-T (the telecommunication standardization sector of the International Telecommunication Union). Also, the H.324 recommendation includes Mode 1 having high complexity and Mode 3 without having complexity. According to Mode 1, while generating a variable length packet an unequal error protection (UEP) is performed by adopting a rate compatible punctured convolutional (RCPC) encoder/decoder (CODEC) in an adaptation layer which is an upper layer. Also, an automatic request for retransmission (ARQ) is used to maintain overall quality of service (QOS) even though the channel throughput decreases. However, the Mode 1 has a high complexity at a portion of RCPC CODEC, which increases the complexity of the overall system. Thus, it is difficult to implement a real-time process. Also, the total channel throughput of the system may decrease rapidly since it adopts a retransmission method. For example, the channel throughput is 50% or less when the retransmission is performed one time, and 33% or less when the retransmission is performed twice. Thus, it is difficult in Mode 1 of H.324 to implement transcoding having compatibility with the conventional H.223. Furthermore, Mode 3 has virtually no error-protection concept, so that error-resiliency in an error-prone channel is very low.

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Page 2, first and second full paragraphs, delete in their entirety and replace with the following new paragraphs:

It is an object of the present invention to provide a multiplexing method for multimedia communication, enabling transcoding with H.223 protocol by adding a flag which is similar to a pseudo noise code (PN CODE), after a high-level data link control (HDLC) flag in the multiplex-protocol data unit (MUX-PDU) by H.223 protocol.

To achieve the object, there is provided a multiplexing method for multimedia communication in H.223 protocol, comprising the steps of: (a) encoding media data; and (b) multiplexing the media data encoded in the step (a) in units of a predetermined frame, and inserting a second flag having a predetermined length with an auto-correlation in the frame after a first flag having the opening and closing of the frame.

Page 3, second full paragraph, delete in its entirety and replace with the following new paragraph.

FIG. 1 is a schematic block diagram of a device for implementing a multiplexing method for multimedia communication, compatible with H.223 protocol, according to the present invention;

FIG. 2A is a diagram showing the structure of a general H.223 MUX-PDU frame; and

FIG. 2B is a diagram showing the structure of an H.223 MUX-PDU frame according to the present invention;

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FIG. 2C is a diagram showing the structure of an H.223 MUX-PDU frame according to a second embodiment of the invention.

FIG. 3A is a diagram showing the structure of the H.223 MUX-PDU frame in a filling mode; and

FIG. 3B is a diagram showing the structure of the H.223 MUX-PDU frame in an abort message mode.

Page 3, last paragraph and continuing to page 4, delete in its entirety and insert the following new paragraph.

In FIG. 1 showing a device for implementing an H.223 multiplexing method for multimedia communication according to the present invention, a multiplexing portion 130 includes an H.223 protocol unit 110 and a transcoder 120. The H.223 protocol unit 110 and the transcoder 120 perform multiplexing with respect to encoded media data (video, audio and other data), passing the encoding media data through protocol data units (not shown) to transmit to a channel.

Page 4, second full paragraph, delete in its entirety and insert the following new paragraph:

As shown in FIG. 2A, the H.223 MUX-PDU is constituted by units of a frame 200, and the frame includes a high-level data link control (HDLC) flag 110 for transmission control, a header 120 including data information, and a payload 130 including video and audio data.

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Page 4, fourth paragraph and continuing to page 5, delete in its entirety and insert the following new paragraph:

FIG. 2B is a diagram showing the structure of an H.223 MUX-PDU frame 210 according to the present invention. The MUX-PDU frame 210 includes an HDLC flag 140, an extra flag 150, a header 160 and a payload 170. The transcoder 120 inserts an 8-bit extra flag 150, which is similar to a pseudo noise code (PN CODE), having a high auto-correlation next to the HDLC flag 150 as shown in FIG. 2B. Here, the reason for selecting the extra flag having a bit pattern of "10110010" is its high auto-correlation similar to the PN code. Thus, only the bit pattern of "10110010" may be added as the extra flag 150, or other bit streams having a high auto-correlation may be used thereas to increase error-resiliency. Also, a longer flag may be added in consideration of a trade-off with a channel band width. Preferably, adding the extra flag, as suggested by the present invention, is prevented by a filling mode in which HDLC flags exist continuously as shown in FIG. 3A or an abort message mode without a payload as shown in FIG. 3B.

Page 5, second and third full paragraphs, delete in their entirety and insert the following new paragraphs:

FIG. 2C is a diagram showing the structure of a MUX-PDU frame of the H.223 protocol according to the present invention. The MUX-PDU frame of the H.233 protocol includes an HDLC flag 240, a header 220, and a payload 230. The HDLC flag 240 converts an 8-bit flag into a 16-bit flag PN code having autocorrelation in order to maintain compatibility with the

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H.223 protocol. The PN code is “1110 0001 0100 1101”. The multiplexing method for multimedia communication according to the present invention is not limited to the particular forms illustrated and further modifications will occur to those skilled in the art. For example, interleaving and RCPC processes may be performed by using each extra flag of a plurality of MUX-PDUs.

As described above, in the multiplexing method for multimedia communication according to the present invention, MUX-PDU including an extra flag having a high auto-correlation is transmitted using H. 223 protocol, increasing the probability of detecting the MUX-PDU by a receiver. Thus, error-resiliency is increased. Furthermore, when the multiplexing method is used together with the RCPC and interleaving methods, error-resiliency can be further increased.

IN THE CLAIMS:

Please enter the following amended claims:

1. (Amended) A multiplexing method for multimedia communication, comprising the steps of:
 - (a) encoding media data; and
 - (b) multiplexing the media data encoded in the step (a) in units of a predetermined frame, and inserting a second flag having a predetermined length with an auto-correlation in the frame after a first flag having the opening and closing of the frame.

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5. (Amended) The multiplexing method of claim 1, wherein the multiplexing of the step (b) is performed together interleaving

Please add the following new claims:

7. A multiplexing method for multimedia communication, comprising the steps of:

(a) encoding media data; and

(b) multiplexing the media data encoded in the step (a) in units of a predetermined frame, and converting an 8-bit sync code forming a flag indicating opening or closing of the frame into a 16-bit pseudo noise sync code.

8. The multiplexing method of claim 7, wherein the 16-bit pseudo noise code in said step (b) has a pattern of “1110 0001 0100 1101”.

IN THE ABSTRACT:

Please delete the present Abstract of the Disclosure and replace it with the following new Abstract of the Disclosure.

A multiplexing method for multimedia communication is provided, which is compatible with the H.223 protocol by changing a header of a multiplex protocol data unit (MUX-PDU). The multiplexing method includes the steps of encoding media data, and multiplexing the media data encoded in the step (a) in units of a predetermined frame, and inserting a second flag having a predetermined length with an auto-correlation [in] into the frame after a first flag [having] representing the opening and closing of the frame. Therefore, the probability of detecting the

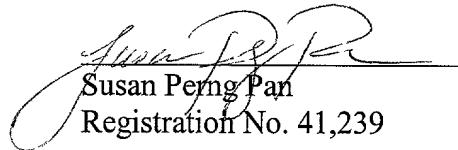
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MUX-PDU by a receiver is increased by adding a flag having a high auto-correlation to the H.
223 MUX-PDU frame, thereby increasing error-resiliency.

REMARKS

Entry and consideration of this Amendment is respectfully requested.

Respectfully submitted,



Susan Peng Pan
Registration No. 41,239

SUGHRUE, MION, ZINN,
MACPEAK & SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3213
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

Date: June 25, 2001

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 1, first full paragraph, please delete in its entirety and insert the following new paragraph:

The present invention relates to a multiplexing method for multimedia communication, and more particularly, to a multiplexing method [compatible with the] which is compatible with H.223 protocol by changing a header of a multiplex-protocol data unit (MUX-PDU).

Page 1, second paragraph and continuing to page 2, delete in its entirety and replace with the following new paragraph.

In general, [the] H.324 recommendation prescribes a multiplexing of video and audio signals which is effective in an error-prone channel such as a wireless channel, and includes H.223 multiplexing, H.245 controlling, H.263 video CODEC and G.723.1 audio CODEC. Also H.223 multiplexing is recommended as a method for multiplexing video, audio and other data in protocol data units (PDU) in order to realize a video telephone and video conferencing in a total digital telecommunication network by the ITU-T (the telecommunication standardization sector of the International Telecommunication Union). Also, the H.324 recommendation includes Mode 1 having high complexity and Mode 3 without having complexity. According to [the] Mode 1, while generating a variable length packet an unequal error protection (UEP) is performed by adopting a rate compatible punctured convolutional (RCPC) encoder/decoder

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(CODEC) in an adaptation layer which is an upper layer. Also, an automatic request for retransmission (ARQ) is used to maintain [the] overall quality of service (QOS) even though the channel throughput decreases. However, the Mode 1 has a high complexity at a portion of RCPC CODEC, which increases the complexity of the overall system. Thus, it is difficult to implement a real-time process. Also, the total channel throughput of the system may decrease rapidly since it adopts a retransmission method. For example, the channel throughput is 50% or less when the retransmission is performed one time, and 33% or less when the retransmission is performed twice. Thus, it is difficult in Mode 1 of [the] H.324 to implement transcoding having compatibility with the conventional H.223. [Meanwhile] Furthermore, Mode 3 has virtually no error-protection concept, so that error-resiliency in an error-prone channel is very low.

Page 2, first and second full paragraphs, delete in their entirety and replace with the following new paragraphs:

It is an object of the present invention to provide a multiplexing method for multimedia communication, enabling transcoding with [the] H.223 protocol by adding a flag which is similar to a pseudo noise code (PN CODE), after a high-level data link control (HDLC) flag in the multiplex-protocol data unit (MUX-PDU) by [the] H.223 protocol.

To achieve the object, there is provided a multiplexing method for multimedia communication in [the] H.223 protocol, comprising the steps of: (a) encoding media data; and (b) multiplexing the media data encoded in the step (a) in units of a predetermined frame, and inserting a second flag having a predetermined length with an auto-correlation in the frame after a first flag having the opening and closing of the frame.

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FIG. 1 is a schematic block diagram of a device for implementing a multiplexing method for multimedia communication, compatible with [the] H.223 protocol, according to the present invention;

FIG. 2A is a diagram showing the structure of a general H.223 MUX-PDU frame; and

FIG. 2B is a diagram showing the structure of an H.223 MUX-PDU frame according to the present invention;

FIG. 2C is a diagram showing the structure of an H.223 MUX-PDU frame according to second embodiment of invention.

FIG. 3A is a diagram showing the structure of the H.223 MUX-[PUD] PDU frame in a filling mode; and

FIG. 3B is a diagram showing the structure of the H.223 MUX-[PDU] PDU frame in an abort message mode.

Page 3, last paragraph and continuing to page 4, delete in its entirety and insert the following new paragraph.

In FIG. 1 showing a device for implementing an H.223 multiplexing method for multimedia communication according to the present invention, a multiplexing portion 130 includes an H.223 protocol unit 110 and a transcoder 120. The H.223 protocol unit 110 and the transcoder 120 [performs] perform multiplexing with respect to encoded media data (video,

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audio and other data), passing the encoding media data through protocol data units (not shown) to transmit to a channel.

Page 4, second full paragraph, delete in its entirety and insert the following new paragraph:

As shown in FIG. 2A, the H.223 MUX-PDU is constituted by units of a frame 200, and the frame includes a high-level data link control (HDLC) flag 110 for transmission control, a header 120 including data information, and a payload 130 including video and audio data.

Page 4, fourth paragraph and continuing to page 5, delete in its entirety and insert the following new paragraph:

FIG. 2B is a diagram showing the structure of an H.223 MUX-PDU frame 210 according to the present invention. The MUX-PDU frame 210 includes an HDLC flag 140, an extra flag 150, a header 160 and a payload 170. The transcoder 120 inserts an 8-bit extra flag 150, which is similar to a pseudo noise code (PN CODE), having a high auto-correlation next to the HDLC flag 150 as shown in FIG. 2B. Here, the reason for selecting the extra flag having a bit pattern of “10110010” is [due to] its high auto-correlation [as the PN CODE does] similar to the PN code. Thus, only the bit pattern of “10110010” may be added as the extra flag 150, or other bit streams having a high auto-correlation may be used thereas to increase error-resiliency. Also, a longer flag may be added in consideration of a trade-off with a channel band width. Preferably, adding the extra flag, as suggested by the present invention [is used, is prevented in] , is prevented by a

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filling mode in which HDLC flags exist continuously as shown in FIG. 3A or an abort message mode without [having] a payload as shown in FIG. 3B.

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FIG. 2C is a diagram showing the structure of a MUX-PDU frame of the H.223 protocol according to the present invention. The MUX-PDU frame of the H.223 protocol includes an HDLC flag 240, a header 220, and a payload 230. The HDLC flag 240 converts an 8-bit flag into a 16-bit flag PN code having autocorrelation in order to maintain compatibility with the H.223 protocol. The PN code is “1110 0001 0100 1101”. The multiplexing method for multimedia communication according to the present invention is not limited to the particular forms illustrated and further modifications [and alterations] will occur to those skilled in the art. [That is] For example, interleaving and RCPC processes may be performed by using each extra flag of a plurality of MUX-PDUs.

As described above, in the multiplexing method for multimedia communication according to the present invention, MUX-PDU including an extra flag having a high autocorrelation is transmitted [in the] using H.223 protocol, increasing the probability of detecting the MUX-PDU by a receiver. Thus, error-resiliency is [also increased. Also] increased. Furthermore, when the multiplexing method is used together with the RCPC and interleaving methods, error-resiliency can be further increased.

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IN THE CLAIMS:

Please enter the following amended claims:

1. (Amended) A multiplexing method for multimedia communication [in the H.223 protocol], comprising the steps of:
 - (a) encoding media data; and
 - (b) multiplexing the media data encoded in the step (a) in units of a predetermined frame, and inserting a second flag having a predetermined length with an auto-correlation in the frame after a first flag having the opening and closing of the frame.

5. (Amended) The multiplexing method of claim 1, wherein the multiplexing of the step (b) is performed together [an] interleaving.

Claims 7 and 8 are added as new claims.

IN THE ABSTRACT:

Please delete the present Abstract of the Disclosure and replace it with the following new Abstract of the Disclosure.

A multiplexing method for multimedia communication is provided, which is compatible with the H.223 protocol by changing a header of a multiplex protocol data unit (MUX-PDU). The multiplexing method includes the steps of encoding media data, and multiplexing the media data encoded in the step (a) in units of a predetermined frame, and inserting a second flag having a predetermined length with an auto-correlation [in] into the frame after a first flag [having] representing the opening and closing of the frame. Therefore, the probability of detecting the

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MUX-PDU by a receiver is increased by adding a flag having a high auto-correlation to the H.223 MUX-PDU frame, thereby increasing error-resiliency.

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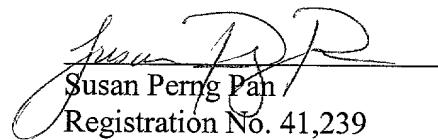
REQUEST FOR APPROVAL OF PROPOSED DRAWING CORRECTIONS

Commissioner for Patents
Washington, D.C. 20231

Sir:

Submitted herewith please find 2 sheet of proposed drawing corrections . **The Examiner is respectfully requested to acknowledge receipt of the drawing corrections and approve the changes.**

Respectfully submitted,



Susan Perng Pan
Registration No. 41,239

SUGHRUE, MION, ZINN,
MACPEAK & SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3213
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

Date: June 25, 2001

FIG. 1

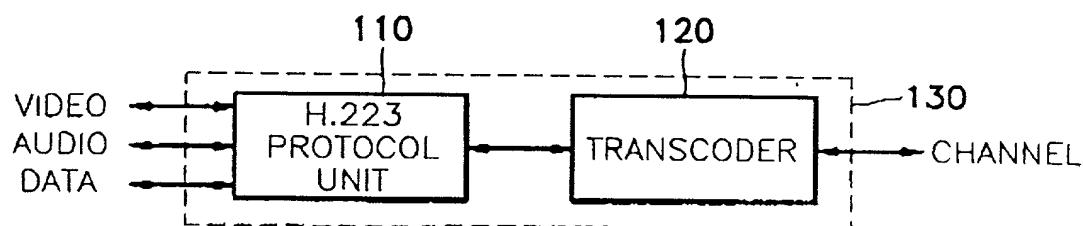


FIG. 2A (PRIOR ART)

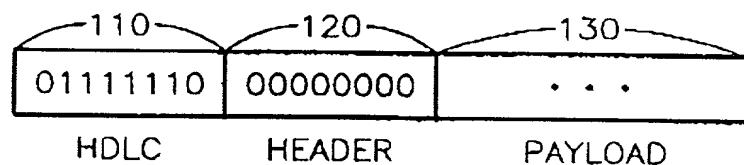


FIG. 2B

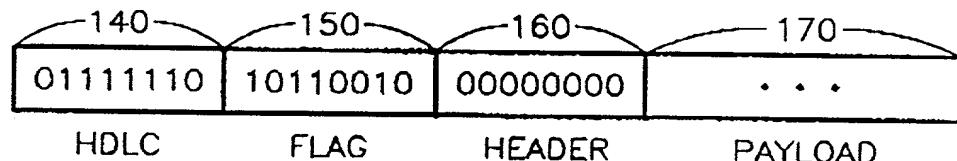


FIG. 2C

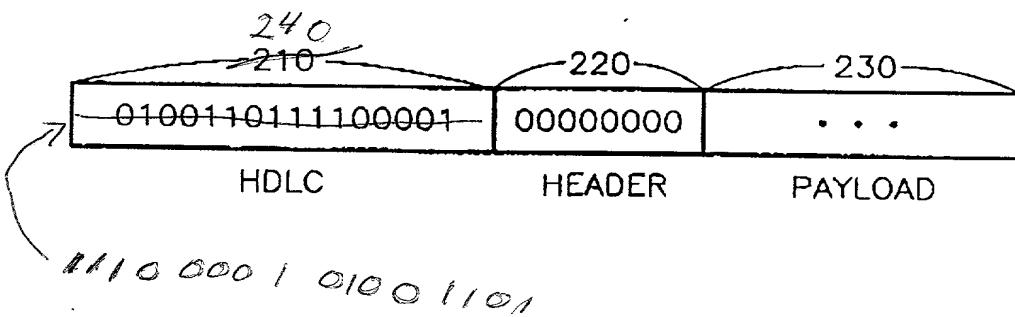


FIG. 1

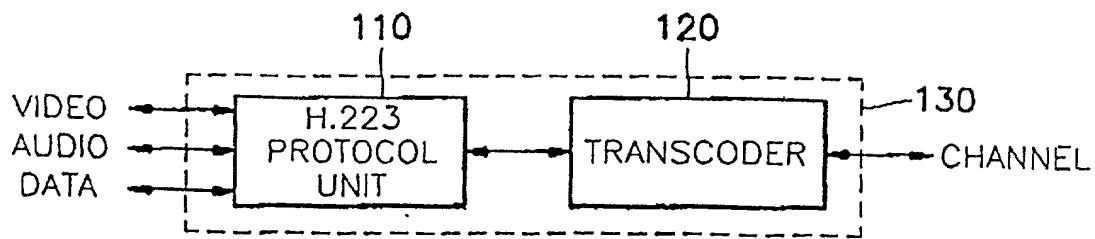


FIG. 2A (PRIOR ART)

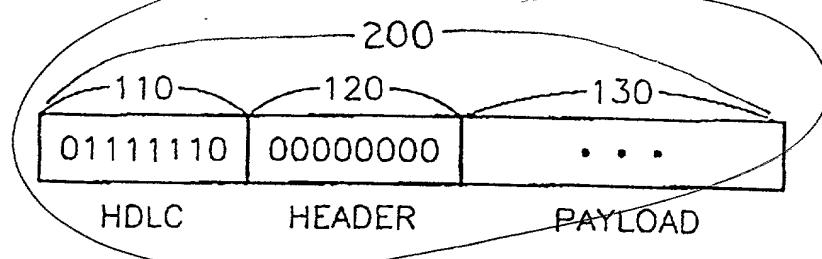


FIG. 2B

